REMARKS

Claims 13 and 15-27 remain in this application. The Examiner has acknowledged that all outstanding rejections have been overcome by Applicants' amendment filed April 16, 2001 and that the substitute specification has been entered. However, Claims 13 and 15-27 have again been rejected. The rejection is not final, however, because of the citation of new references discussed below.

Claims 13 and 15-25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,708,053 to Jalics et al. Specifically, the Examiner has alleged that the difference between Jalics et al. and the present invention is the requirement in the present claims of a specific type of amine, such as aliphatic amine or cycloaliphatic amine. The Examiner further stated that it would have been obvious to one of ordinary skill in the art to choose an aliphatic amine or cycloaliphatic amine as the particular amine in the disclosure of Jalics et al. and thereby arrive at the presently claimed invention.

Applicants respectfully submit that Claims 13 and 15-25 are patentable over the disclosure of Jalics et al. Specifically, Applicants first note that the purpose of Jalics et al. is to provide an efficient method of processing a silica-filled rubber composition which contains a particulate precipitated silica having dispersed thereon a silane-modified elastomer. (See col. 1, lines 25-30). It is not an objective of Jalics et al. to provide a rubber composition having improved hysteresis and reinforcement properties for use in a tire tread as is the primary objective of the present invention. This goal is achieved in the present invention by the synergistic combination of a substituted guanidine and a free aliphatic or cycloaliphatic amine.

The Examiner stated in Paragraph 3 of the Office Action that Jalics et al. disclose 0.05-3 phr guanidine and 0.5-4 phr free amine. However, the section of the disclosure of Jalics et al. reciting these amounts emphasizes that the method of processing a silica-filled rubber composition works efficiently whatever the accelerators for vulcanization may be. (See col. 8, line 61 to col. 9, line 17). This part of the disclosure of Jalics et al. states generally that in one embodiment, 0.5-4 phr of a single primary accelerator may be used, while in a second embodiment, a combination of 0.5-4 phr of a primary accelerator and 0.05-3 phr of a secondary accelerator may be used. The Jalics et al. disclosure goes on to recite suitable types of accelerators that may be employed, including amines, disulfides, guanidines, thioureas, thiazoles, thiurams, sulfenamides, dithiocarbamates, and xanthates. Jalics et al. further mention that the primary accelerator is preferably a sulfenamide and that if a secondary accelerator is used, it is preferably a guanidine, a dithiocarbamate, or a thiuram compound.

Consequently, Jalics et al. do not disclose the combination of a primary accelerator made of amine and a secondary accelerator made of guanidine. Instead, Jalics et al. disclose only possible combinations of a primary accelerator and a secondary accelerator including (i) a sulfenamide and a guanidine; (ii) a sulfenamide and a dithiocarbamate; and (iii) a sulfenamide and a thiuram compound. Thus, Applicants respectfully submit that it would not be obvious to one of ordinary skill in the art to infer from the list of nine types of accelerators the use of an amine as a primary accelerator in combination with a guanidine as a secondary accelerator as in the present invention.

Moreover, the Examples of Jalics et al. (for example in Table I at column 11) confirm that the explicit disclosure of Jalics et al. with respect to vulcanization accelerators is, in fact, the combination of a sulfenamide (such as cyclobenzylsulfenamide) and a guanidine (such as

diphenylguanidine) as is disclosed in the preferred embodiment described above and found at column 9, lines 15-18.

Significantly, in Examples 1-6 of the present application, the disclosure teaches that the *addition* of a free aliphatic or cycloaliphatic amine (for example, DDCHMI or dodecyl-hexamethylene imine) to a "witness" composition defined by formula F1 (see Specification, page 15), which comprises DPG (diphenylguanidine) and CBS (cyclobenzylsulfenamide) (namely, the exact same accelerators disclosed by Jalics et al. in column 9 and in Table I at column 11), is able to impart to the compositions of the present invention much *improved* hysteretic and reinforcing properties than those of the "witness" composition.

Thus, the improvement of adding the amine to the composition of the present invention is not obvious in view of the disclosure of Jalics et al. The difference between the disclosure of Jalics et al. and the presently claimed invention is not only the requirement of a specific type of amine (namely an aliphatic or cycloaliphatic amine), but also the synergistic and non-obvious combination of that amine and a guanidine. This synergistic effect of the claimed invention is evident in Example 4 of the present application (see Specification, pages 32-35), wherein both the amine *and* the guanidine must be present in the composition to obtain the improvement of the hysteretic and reinforcing properties. Therefore, Applicants respectfully submit that Claims 13 and 15-25 are patentable over Jalics et al.

In addition, Claims 13, 15-22, and 24-27 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over newly cited U.S. Patent No. 5,939,493 to Hojo in view of Jalics et al. The Examiner stated that Hojo discloses a sulfur vulcanized rubber composition suitable for use in a tire tread and sidewall composition and that Hojo discloses the use of vulcanization accelerators, with no

explicit disclosure of guanidine. Generally, the Examiner asserted that it would have been obvious to one of ordinary skill in the art to use guanidine in the rubber composition of Hojo in order to control the time and temperature required for vulcanization as well as improve the properties of the vulcanizate, and thereby arrive at the presently claimed invention.

Applicants respectfully submit that Claims 13, 15-22, and 24-27 of the present application are patentable over Hojo in view of Jalics et al. Specifically, Applicants note first that the object of the Hojo disclosure is to provide a rubber composition comprising a diene rubber and a vulcanization accelerator consisting of a metal dithiophosphate, wherein the rubber composition has improved resistance to heat aging, improved resistance to hardening, and improved fracture properties. (See column 2, lines 16-23). Hojo does not seek to provide rubber compositions having improved hysteresis and reinforcement properties specifically for use in a tire tread, contrary to the primary objective of the present invention, which is achieved by the synergistic combination of a substituted guanidine and a free aliphatic or cycloaliphatic amine.

The rubber compositions according to the disclosure of Hojo are said to be effective whatever the reinforcing filler may be, so that carbon black is contemplated as an adequate filler and may even serve as the sole reinforcing filler. (See col. 8, lines 17-23 and 42-28, embodiment marked "MA".) Furthermore, the rubber compositions of Hojo comprise other vulcanization accelerators (see column 2, line 61 to column 3, line 53), such as benzothiazole derivatives, thiuram compounds, amino groups, 2-benzothiazylsulfenamides, and 2-benzothiazylsulfenimides. Even though the amine compound is cited amongst the other possible vulcanization accelerators, Hojo emphasizes in column 2, liens 24-30 that the "problem of insufficient heat resistance could be solved by the following means,

using antimony dithiophosphates which have not heretofore been paid attention as a vulcanization accelerator."

As described in detail above, Jalics et al. provide an efficient method of processing a silica-filled rubber composition which comprises a particulate precipitated silica having dispersed thereon a silane-modified elastomer (see column 1, lines 25-30), wherein the method works efficiently whatever the accelerators for vulcanization may be. The disclosure of Jalics et al. is described irrespective of any particular vulcanization system, and allows for all usual vulcanization accelerators to be used (such as the use of DPG and CBS in the Examples of Jalics et al.). In contrast, Hojo discloses a carbon black-filled composition, which solves the problem of heat aging and thus has nothing to do with the problem of processing a silica-filled rubber composition. Furthermore, the disclosure of Hojo is based on the finding of a very specific vulcanization accelerator, namely a metal dithiophosphate. Therefore, it would not be obvious to one of ordinary skill in the art to combine these two references and arrive at the presently claimed invention.

Applicants again note that the synergistic effect of the presently claimed invention is evident in Example 4 of the present Specification (see pages 32-35), wherein both the amine and the guanidine must be present in the composition to obtain the improved hysteresis and improved reinforcement properties. Thus, the use of an amine or guanidine alone (as might be inferred from Hojo and/or Jalics et al.) is insufficient to achieve the results of the present invention including improved hysteretic and reinforcement properties. Thus, Applicants respectfully submit that Claims 13, 15-22, and 24-27 of the present application are patentable over Hojo in view of Jalics et al.

Furthermore, Claims 13, 15-22, and 24-25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,804,644 to Nakafutami et al. or U.S. Patent No. 5,534,592 to Halasa et al., either of which in view of either Hojo or newly cited U.S. Patent No. 5,939,484 to Araki et al. The Examiner stated that the difference between either Nakafutami et al. or Halasa et al. and the presently claimed invention is the requirement in the instant claims of free amine. The Examiner further stated that in light of the motivation for using an amine compound disclosed by either Hojo or Araki et al., it would have been obvious to one of ordinary skill in the art to use such an amine in the rubber composition of either Nakafutami et al. or Halasa et al. in order to produce a composition with improved resistance to heat aging and abrasion, or alternatively, to improve the dispersion of silica, and thereby arrived at the presently claimed invention.

Applicants respectfully submit that Claims 13, 15-22, and 24-25 are patentable over Nakafutami et al. or Halasa et al., either of which in view of either Hojo or Araki et al. First, Applicants address the subject claims with respect to Nakafutami et al. in view of Hojo. The objective of the disclosure of Nakafutami et al. is to provide a rubber composition having improved resilience, wet skid properties and processability, wherein the composition comprises a raw material rubber containing a specified polymer structure, silica, and a vulcanizing agent. (See column 3, lines 10-25.) More particularly, Nakafutami et al. specify that the raw material rubber must contain not less than 30% by weight of a partially hydrogenated diene elastomer. (See column 3, lines 29-34.) The disclosure of Nakafutami et al. does not address the goal of improving the reinforcement properties of a tire tread rubber composition, as does the present invention.

In column 7, lines 5-20, Nakafutami et al. disclose the use of a vulcanizing agent (sulfur or a sulfur compound) in combination with a vulcanizing accelerator, which "includes compounds of a

guanidine type, an aldehyde-amine type, an aldehyde-ammonia type, a thiazole type, a sulfenic amide type, a thiourea type, a thiuram type, a dithiocarbamate type, a xanthate type, etc." This list thus describes all commonly used accelerators. Then, in the Examples, specifically in Table 6, Nakafutami et al. teach the combination of a primary and a secondary accelerator, respectively a sulfenamide (N-cyclohexyl-2-benzothiazolylsulfenamide) and a guanidine (diphenylguanidine), the same well-known combination that is shown in Jalics et al and described above.

Thus, Nakafutami et al. disclose a silica-filled rubber composition, which improves resilience, wet skid properties, and processability and which specifically contains a hydrogenated diene rubber. This rubber composition works effectively whatever the vulcanizing accelerator may be, and all the usual vulcanization accelerators are deemed acceptable. In contrast, Hojo involves a carbon black-filled composition which addresses the problem of heat aging, and thus does not concern the same problems as the disclosure of Nakafutami. Furthermore, the findings of Hojo are based on a very specific vulcanization accelerator, namely a metal dithiophosphate. Thus, it would not have been obvious to one of ordinary skill in the art to combine these references and arrive at the presently claimed invention because the references have contradictory teachings.

Applicants again reiterate the importance of the synergistic effect of the presently claimed invention, shown in Example 4 of the Specification (pages 32-35), wherein both the amine and the guanidine must be present in the composition in order to obtain the improved properties described by the present disclosure. The use of an amine or a guanidine alone (as may be contemplated by Hojo and Nakafutami et al.) is insufficient to achieve the desired results of improved hysteresis and improved reinforcement properties. Thus, Applicants submit that Claims 13, 15-22, and 24-25 are patentable over Nakafutami et al. in view of Hojo.

Applicants next address the subject claims with respect to the disclosure of Halasa et al. in view of Hojo. The primary objective of Halasa et al. is to provide a silica-filled rubber composition designed to impart an improved wet skid resistance and traction to a tire tread, wherein the composition comprises a blend of three very specific polybutadiene rubbers which differ from each other by their respective vinyl contents. (See col. 3, line 49 to col. 4, line 24.) Halasa et al. do not mention any particular vulcanization system, meaning that the invention described therein is effective irrespective of the type of vulcanization system (and thus irrespective of whatever vulcanization accelerator(s) are used). In the Examples, Halasa et al. teach a combination of a primary and secondary accelerator, specifically a sulfenamide (CBS) and a guanidine (DPG), respectively, which is the same well-known combination shown in Jalics et al. and Nakafutami et al. (See Table II.)

Thus, Halasa et al. provide a silica-filled rubber composition meant to solve the problems of wet skid resistance and traction, which specifically contains a blend of polybutadienes and no vinyl aromatic monomer and which works efficiently no matter what vulcanization accelerator is used. Hojo, in contrast to Halasa et al., involves a carbon black-filled composition which *may comprise* styrene monomers (such as SBR as seen in the Examples and in Claim 6) and which addresses the problem of heat aging. The goal of Hojo is not related to the traction problems addressed by Halasa et al., and the findings of Hojo are based on a very specific vulcanization accelerator (namely a metal dithiophosphate). Thus, it would not be obvious to one of ordinary skill in the art to combine these two references, in that they have contradictory teachings.

Applicants repeat the importance of the synergistic effect of the claimed invention, which is evident in Example 4, pages 32-35 of the present Specification, wherein both the amine and the

guanidine must be present in the composition in order to obtain the improved hysteresis and reinforcement. Thus, Applicants respectfully submit that Claims 13, 15-22, and 24-25 are patentable over Halasa et al. in view of Hojo.

Applicants now address the subject claims with respect to Nakafutami et al. or Halasa et al. in view of Araki et al. The object of the disclosure of Araki et al. is to provide a silica-filled rubber composition based on a diene elastomer, which is designed, on the one hand, to suppress gelation of the elastomer due to a silane coupling agent during mixing at high temperatures and, on the other hand, to improve the dispersion of silica into the rubber composition. Thus, Araki et al. disclose the use of a specific type of silane coupling agent and a specific type of silica dispersion improver, which is selected from the group consisting of hexamethyldisilazane, hydrogen silicone oils, silicone oils modified with an alkoxy group or an amino group, carbonyl compounds containing nitrogen, and amine compounds.

Thus, Nakafutami et al. and Halasa et al. each provide a rubber composition solving the problem of wet skid resistance which may comprise a specific diene rubber (either a hydrogenated diene rubber or a blend of polybutadienes excluding SBR), while Araki et al. discloses a composition comprising *any* diene rubber (which may even comprise styrene monomers) that is meant to solve the problems of gelation of the elastomer and dispersion of the silica, in contrast to the wet skid resistance addressed by Nakafutami et al. and Halasa et al. Applicants therefore respectfully submit that it would not be obvious to one of ordinary skill in the art to combine these references and arrive at the presently claimed invention and that Claims 13, 15-22, and 24-25 are patentable over either Nakafutami et al. or Halasa et al. in view of Araki et al.

Lastly, Claims 13, 15-21, and 26-27 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,140,393 to Bomal et al. in view of either Hojo or Araki et al. The Examiner stated that Bomal et al. disclose a sulfur vulcanized rubber composition that is suitable for use in a tire casing composition and that the difference between Bomal et al. and the presently claimed invention is the requirement in the instant claims of free amine. The Examiner also stated that in light of the motivation for using an amine compound as disclosed by either Hojo or Araki et al., it would have been obvious to one of ordinary skill in the art to use such an amine in the rubber composition of Bomal et al. in order to produce a composition with improved resistance to heat aging and abrasion, or alternatively, to improve the dispersion of silica, and thereby arrive at the presently claimed invention.

Applicants first address the subject claims with respect to Bomal et al. in view of Hojo. Applicants note that the objective of the disclosure of Bomal et al. is to provide a silica-filled rubber composition comprising a specific reinforcing additive that imparts an improved scorch safety to the composition. This reinforcing additive consists of the mixture and/or the product of an *in situ* reaction of a functionalized polyorganosiloxane and a functionalized organosilane compound. In the Examples, Bomal et al. teach the combination of a primary and a secondary accelerator (a sulfenamide such as cyclobenzylsulfenamide or CBS, and a guanidine such as DPG, respectively), which is the well-known combination described above. The disclosure of Bomal et al. efficiently works irrespective of the vulcanization accelerator used (since the patent discloses using all usual vulcanization accelerators such as CBS and DPG mentioned above).

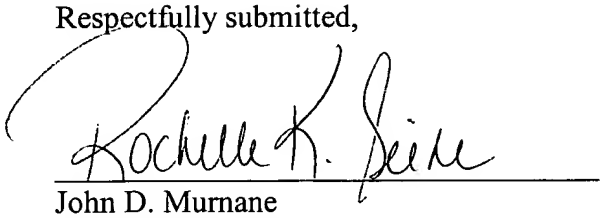
Hojo, unlike Bomal et al., discloses a carbon black-filled composition meant to solve the problem of heat aging and is based on the use of a very specific vulcanization accelerator (namely, a metal dithiophosphate). Thus, it would not be obvious to one having ordinary skill in the art to combine

these two references because they have contradictory teachings. Applicants therefore submit that Claims 13, 15-21, and 26-27 are patentable over Bomal et al. in view of Hojo.

Applicants finally address the subject claims with respect to Bomal et al. in view of Araki et al. In view of the comments regarding Araki et al. above, Applicants further assert that Araki et al. provide a composition designed to suppress the gelation of the elastomer due to a silane coupling agent during mixing at high temperatures and to improve the dispersion of silica into the composition by using a specific type of silane coupling agent and a specific type of silica dispersion improver. As mentioned above, the objective of Bomal et al. is to improve scorch safety, which differs from the problems that Araki et al. is meant to address. Thus, it would not have been obvious to one of ordinary skill in the art to select the amine compounds (merely cited in Araki et al. as a possible type of silica-dispersion improver) and use such an amine compound in the process disclosed by Bomal et al. There is no suggestion in the art to combine the disclosures of Araki et al. and Bomal et al. and select an amine compound to arrive at the non-obvious combination of a guanidine and an amine as required by the claims of the present invention. Thus Applicants respectfully submit that Claims 13, 15-21, and 26-27 are patentable over Bomal et al. in view of Araki et al.

In view of the foregoing remarks, Applicants believe that Claims 13 and 15-27 of the present application are in condition for allowance. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



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